Synthetic Data from Diffusion Models Improves ImageNet Classification

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Abstract

Deep generative models are becoming increasingly powerful, now generating diverse high fidelity photo-realistic samples given text prompts. Have they reached the point where models of natural images can be used for generative data augmentation, helping to improve challenging discriminative tasks? We show that large-scale text-to image diffusion models can be fine-tuned to produce class conditional models with SOTA FID (1.76 at 256x256 resolution) and Inception Score (239 at 256x256). The model also yields a new SOTA in Classification Accuracy Scores (64.96 for 256x256 generative samples, improving to 69.24 for 1024x1024 samples). Augmenting the ImageNet training set with samples from the resulting models yields significant improvements in ImageNet classification accuracy over strong ResNet and Vision Transformer baselines.